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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/678,990	10/04/2000	Henry Lukas	655.00809	4910

7590

09/11/2003

WOOD, PHILLIPS, VAN SANTEN, CLARK & MORTIMER
500 WEST MADISON STREET SUITE 3800
CHICAGO, IL 60661

EXAMINER

PATEL, NIHIR B

ART UNIT

PAPER NUMBER

3743

DATE MAILED: 09/11/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/678,990

Applicant(s)

LUKAS ET AL.

Examiner

Nihir Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on June 2nd, 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10 and 12-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1 through 8, 10, and 12- through 20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 6, 7, 12, 13, 14, 15, 16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tholen US Patent No. 4,660,532 in view of Schroder US Patent No. 4,104,185.

Tholen discloses the applicant's invention as claimed with the exception of providing a phase change material that is sealed within the at least one tube.

Schroder discloses a latent heat accumulator that does provide a phase change material that is sealed within the at least one tube. Therefore it would be obvious to modify Tholen's invention by providing a phase change material that is sealed within the at least one tube in order to increase the heat transfer process.

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tholen US Patent No. 4,660,532 in view of Tsunekawa Patent No. JP363057855A.

Tholen discloses the applicant's invention as claimed with the exception of providing tubes that are brazed together to form a tube matrix and also brazed to the inner wall of the salt case in a pattern of brazed connections that are cyclically uniform and repetitive.

Tsunekawa discloses stirling engine that does provide tubes that are brazed together to form a tube matrix and also brazed to the inner wall of the salt case in a pattern of brazed connections that are cyclically uniform and repetitive (see figure 3). It is obvious to one in the ordinary skill of the art to provide tubes that are brazed together to form a tube matrix and also brazed to the inner wall of the salt case in a pattern of brazed connections that are cyclically uniform and repetitive in Tholen's invention in order to increase the heat transfer rate.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tholen US Patent No. 4,660,532 in view of Takahashi et al. US Patent No. 4,463,799.

Tholen discloses the applicant's invention as claimed with the exception of providing a baffle extending through the matrix between the runs; the inlet conduit being connected to the salt case on one side of the baffle, the outlet conduit being connected to the salt case on the other side of the baffle.

Takahashi discloses a heat storage medium for latent heat thermal energy storage unit that does provide a baffle extending through the matrix between the runs; the inlet conduit being connected to the salt case on one side of the baffle, the outlet conduit being connected to the salt case on the other side of the baffle 3 (see figure 2). It is obvious to one in the ordinary skill of the art to provide a baffle extending through the matrix between the runs; the inlet conduit being connected to the salt case on one side of the baffle, the outlet conduit being connected to the salt

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case on the other side of the baffle in Tholen's invention in order to increase the heat transfer rate.

Claims 8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tholen US Patent No. 4,660,532 in view of Boyer et al. US Patent No. 4,344,480.

Referring to claim 8, Tholen discloses the applicant's invention as claimed with the exception of providing a salt case that includes a plurality of parallel, elongated, inwardly directed spaced ribs, the runs having spaced centers, the spacing between the ribs being the same as the spacing between the centers, the runs on the matrix exterior being nested between two adjacent ribs and each having one of the contact points with each of the two adjacent ribs.

Boyer discloses a support for heat exchange tubes that does provide a case that includes a plurality of parallel, elongated, inwardly directed spaced ribs 28 (see figure 2), the runs having, spaced centers, the spacing between the ribs being the same as the spacing between the centers, the runs on the matrix exterior being nested between two adjacent ribs and each having one of the contact points with each of the two adjacent ribs (see figures 2 and 3). It is obvious to one in the ordinary skill of the art that a case that includes a plurality of parallel, elongated, inwardly directed spaced ribs, the runs having spaced centers, the spacing between the ribs being the same as the spacing between the centers, the runs on the matrix exterior being nested between two adjacent ribs and each having one of the contact points with each of the two adjacent ribs be used in Tholen's invention in order to reduce the size of the storage tank which will increase the heat transfer rate.

Referring to claim 17, Tholen discloses the applicant's invention as claimed with the exception of providing an outer jacket that comprises a plurality of strengthening ribs.

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Boyer discloses a support for heat exchange tubes that does provide an outer jacket that comprises a plurality of strengthening ribs (see figures 2 and 3). It is obvious to one in the ordinary skill of the art to use an outer jacket that comprises a plurality of strengthening ribs in Tholen's invention in order to hold the tubes tightly together.

Allowable Subject Matter

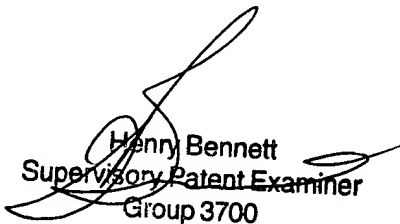
3. Claims 18 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Nihir Patel whose telephone number is (703) 306-3463. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful the examiner supervisor Henry Bennett can be reached at (703) 308-0101.

NP
August 25, 2003


Henry Bennett
Supervisory Patent Examiner
Group 3700